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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/981,305	10/15/2001	Patricia S.M. Chong	130109.437	5010

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EXAMINER

KERNS, KEVIN P

ART UNIT

PAPER NUMBER

1725

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/981,305	CHONG, PATRICIA S.M.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Kevin P. Kerns	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2001 and 14 January 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/15/02 &amp; 2/21/03</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the feed gas inlet (claims 1, 13, and 14); the injector (claims 1, 13, and 14); the catalyst bed with details of the front/rear portions, the metal foam pore sizes, and catalyst loading (claims 1-9, 13, and 14); the process gas outlet (claims 1, 13, and 14); the precooler (claim 13); and the supplies of carbon monoxide, hydrogen, and oxygen (claim 14) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of

Art Unit: 1725

any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

In this instance, the legal phraseology "consists essentially of" and "comprising" is used throughout the abstract.

### ***Claim Objections***

3. Claim 14 is objected to because of the following informalities: in the 4<sup>th</sup> line of the claim, ":" should be added after "of". In the 5<sup>th</sup> line of the claim, "fuel" should be changed to "feed" before "gas" for consistency. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1725

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Gray et al. (WO 00/32513).

Gray et al. disclose a reactor and process for removal of carbon monoxide from hydrogen, in which the reactor includes the following: one or more selective oxidation stages and counter-current cooling (5,6,7), defining a precooler; a feed gas inlet 2 for carbon monoxide and hydrogen; an air/oxygen injector 8 upstream of the feed gas inlet 2; a catalyst bed 4 that includes a metal foam support in the form of a honeycomb monolith (50-1200 cells per square inch) that carries a platinum selective oxidation catalyst; and a process gas outlet 3 (abstract; page 1, line 26 through page 5, line 25; and Figure 1).

6. Claims 1 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Plog et al. (EP 0 650 922).

Plog et al. disclose a reactor and process for removal of carbon monoxide from hydrogen, in which the reactor includes the following: one or more selective oxidation stages and cooling means; a feed gas inlet for carbon monoxide and hydrogen; an

air/oxygen injector upstream of the feed gas inlet; a catalyst bed that includes a metal foam support that carries a platinum selective oxidation catalyst; and a process gas outlet (abstract; column 3, lines 39-58; column 4, lines 1-3; and Figure 3).

7. Claims 1 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Graham et al. (US 5,937,641).

Graham et al. disclose a catalytic converter that includes a feed gas inlet, an (air) injector upstream of the feed gas inlet, a catalyst bed that includes a rigid, foam-like metallic material (made of an alloy that includes aluminum, chromium, iron, and rare earths (yttrium)) and a platinum catalyst, and a gas outlet (abstract; column 2, lines 42-67; column 3, lines 1-53; column 4, line 47 through column 8, line 23; and Figures 1-8). A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Further, the examiner notes that intended use limitations, such as "for directing a feed gas comprising carbon monoxide and hydrogen into the assembly" do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating to the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

8. Claims 1 and 11-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Lesieur et al. (US 6,284,206).

Lesieur et al. disclose a selective oxidizer assemblage reactor for a fuel cell power plant, in which the reactor includes the following: one or more selective oxidation stages and cooling means (22,24) defining a precooler; a feed gas inlet 16 for carbon monoxide and hydrogen; an air/oxygen injector 18 upstream of the feed gas inlet 16; a catalyst bed 2 that includes an open cell metal foam network in the form of a honeycomb monolith that carries a platinum selective oxidation catalyst; and a process gas outlet 20 (abstract; column 2, lines 31-67; column 3, lines 1-67; column 4, lines 1-4 and 31-67; column 5, line 1 through column 7, line 38; and Figures 1-5).

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of Gray et al. (WO 00/32513), Plog et al. (EP 0 650 922), or Lesieur et al. (US 6,284,206) in view of Abe et al. (EP 0 968 958).

Gray et al., Plog et al., and Lesieur et al. individually disclose the features of claim 1 above. Neither Gray et al., Plog et al., nor Lesieur et al. specifically discloses the pore size of the alloy metal foam in front and rear portions of the catalyst bed.

However, Abe et al. disclose a reformer that includes two or more catalyst units in the flow path (for increasing efficiency of hydrogen production and reduction in CO production), such that each of the catalyst units have porous honeycomb structures (e.g. aluminum/chromium/iron alloy, which has favorable properties in a high temperature reactor environment) with varying cell/pore density (in the range of 4-2000 cells per square inch) at specified locations (upstream versus downstream) in the catalyst unit assembly, for the purpose of increasing hydrogen production while decreasing CO production, while appropriately controlling the reaction in terms of the reactant concentration and heat generation from the reaction (abstract; paragraphs [0007]-[0013] and [0047]-[0190]; and Figures 1-33).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the reactors of any one of Gray et al., Plog et al., or Lesieur et al., by adding the alloy honeycomb structures with varying cell/pore density (in the range of 4-2000 cells per square inch for optimum efficiency) at specified locations (upstream versus downstream) in the catalyst unit assembly, as taught by Abe et al., in order to increase hydrogen production while decreasing CO production, while appropriately controlling the reaction in terms of the reactant concentration and heat generation from the reaction (Abe et al.; abstract; and paragraphs [0007]-[0013] and [0051]-[0058]).



**Conclusion**

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Aoyama and Groeneveld et al. references are also cited as related art.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 6/28/04*  
Examiner  
Art Unit 1725

*KPK*  
kpk  
June 28, 2004